

**COMBINED PRELIMINARY ASSESSMENT / SITE INSPECTION
DRAFT QUALITY ASSURANCE SAMPLING PLAN
BOOKER LANDFILL
HOUSTON, HARRIS COUNTY, TEXAS**

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY

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1. INTRODUCTION

1.1 PURPOSE

Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START-2) has been tasked by the U.S. Environmental Protection Agency (EPA) Region 6 under Contract Number 68-W-01-005, Technical Direction Document (TDD) 06-03-09-0004 to perform a Combined Preliminary Assessment / Site Inspection (PA/SI) at the Booker Landfill site, Houston, Harris County, Texas. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Identification Number assigned to the site is TXN000605565. START-2 has prepared this PA/SI Quality Assurance Sampling Plan (QASP) to describe the technical scope of work for field activities to be completed as part of this investigation.

1.2 OBJECTIVES

START-2 is providing technical assistance to EPA Region 6 for the performance of a PA/SI at the Booker Landfill Site. The objective of the PA/SI is to identify potential threats that hazardous substances attributable to the site may pose to human health and the environment by assessing the existence and migration of hazardous substances related to the site and by identifying the receptors, or targets, potentially exposed to the hazardous substances. START-2 will collect and analyze surface soil samples to characterize potential hazards. In general, the samples collected will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, cyanide, and 23 metals. The data generated during this assessment will be used to develop a SuperScreen HRS scoring for the Booker Landfill site.

1.3 PROJECT TEAM

The project team will consist of Steve Michell, P.G., START-2 Deputy Program Manager; Michelle Brown, START-2 Project Team Leader (PTL) and Field Team Leader (FTL); a Sample Manager; and additional START-2 sampling personnel as necessary. The FTL will be responsible for the technical work performed in the field and will serve as the START-2 liaison to EPA Region 6 and Texas Commission on Environmental Quality (TCEQ) personnel during the site activities. The FTL

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will collect samples as necessary, log the activities at each sample location in the field logbook, and verify the sample documentation. The Sample Manager will be responsible for accurate chain-of-custody documentation for the samples during the investigation, as well as the packaging and shipping of the samples to the designated laboratory. The sampling personnel will be responsible for collecting samples as directed by the EPA representative and START-2 FTL according to standard operating procedures (SOPs).

1.4 QASP FORMAT

This QASP has been organized in a format that is intended to facilitate the PA/SI. The QASP is organized as follows:

- Section 1 - Introduction
- Section 2 - Site Background
- Section 3 - Sampling Approach and Procedures
- Section 4 - Quality Assurance

All tables are included at the end of each representative section. All figures and appendices are available as PDF files on the Team Link website. The following is a list of appendices:

- Appendix A - Site Access Agreement Letters
- Appendix B - Site-Specific Data Quality Objective
- Appendix C - Standard Operating Procedures

2. SITE BACKGROUND

The Booker Landfill site is a former municipal landfill. Information regarding the site location and description, site history, and site features are presented in the following subsections. This information was obtained based on discussions with Bill Rhotenberry, the EPA Site Assessment Manager (SAM), and Chuck Roosevelt, a representative of City of Houston; a review of available EPA and City of Houston files; and the START-2 site reconnaissance conducted on 2 October 2003.

2.1 SITE LOCATION

The Booker Landfill site is located south of Tidwell Road, between Ella Boulevard and Rosslyn Road, in Houston, Harris County, Texas. The former entry to the landfill is at the northeast corner of the site at approximately Latitude 29.84664° North and Longitude 95.73362° West and is referenced on the Houston Heights, TX, U.S. Geological Survey (USGS) 7.5-minute quadrangle. A site location map is provided as Figure 2-1. Figure 2-2 depicts a site area map.

2.2 SITE HISTORY AND DESCRIPTION

The Booker Landfill site (also known as the West Donovan Landfill) was an un-permitted municipal landfill operated by Mr. Raymond Booker from the late 1960s to the early 1970s. The Booker Landfill site is approximately 30 acres in size and is situated in a suburban area. Tidwell Road borders the site on the north, Rosslyn Road on the west Ella Boulevard on the east and West Donovan Street on the south. Residences are located west of Ella Boulevard and north of West Donovan Street. No buildings are on the property, and the entire site is unfenced. The site consists of broad, flat areas of barren soil caused by what appears to be the recent grading of fill soil. The only visible trash observed during the START 2 site reconnaissance was found in a ditch running along the south end of the site, adjacent to several residences, whose backyards abut the site. Areas along the ditch, and around the perimeter of the site, and between barren areas are thickly vegetated.

The topography of the site is flat, with a slight slope north towards Tidwell Road and with a steep incline from a berm on the south towards the ditch. At its highest point, on the southwest edge of the property, the site is approximately 15 feet above the ditch. The ditch conveys runoff from south of

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the Booker Landfill site toward W. Donovan Street through two intersecting streets, Phillips Road to the west and Bersey Lane to the east. Stormwater eventually enters the city drainage system off W. Donovan Street and flows into Whiteoak Bayou.

PREVIOUS INVESTIGATIONS

Because of health concerns posed by local residences, Quantum Environmental Consultants, Inc. conducted a Limited Environmental Site Assessment (ESA) for the Ella Park Terrance Civic Club in April 2003. As part of the investigation, Quantum provided preliminary data on potential contaminants that may have migrated from Booker Landfill site and impacted surface soils and standing surface water in the area of the Acres Homes Subdivision located along West Donovan Street. Based on the limited scope of this April 2003 ESA, sufficient data were not available to determine whether the contamination at the subject property was due to offsite surface migration from the former landfill property or from other potential sources. Since the extent of contamination in the soil was not determined, further assessment was recommended.

Quantum collected samples from the site and surrounding properties in May 2003. Soil samples were collected from eight residential properties on the north and south side of West Donovan Street and on the south side of the Booker Landfill site. Surface water samples were collected from standing water in two locations on or near the West Donovan Street residential properties. All samples were analyzed for volatile organic compounds (VOCs), semi-volatile compounds (SVOCs), Total petroleum hydrocarbons (TPH), and metals. The surface water samples were also analyzed for poly-chlorinated biphenyls (PCBs). Analytical results of the soil samples collected indicated VOCs and SVOCs were below laboratory detection limits except for Benzo (g,h,l) perylene. TPH and metals (arsenic, barium, cadmium, chromium, and lead) were detected in soil. Barium, cadmium, and lead concentration were above TCEQ Tier 1 Concentration Levels (PCLs) for residential, 0.5-acre source area, groundwater-protective soil concentration. TPH levels were also shown to be elevated in some sampling locations. Samples obtained from the standing water had concentrations below detection limits for PCBs, VOCs, SVOC, and TPH. Barium was detected in the surface water samples, but below TCEQ PCLs for Residential, 0.5-acre source area, groundwater-protective soil concentrations.

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2.4 POTENTIAL SOURCES OF HAZARDOUS SUBSTANCES

Based on the results of the previous investigation described above, the following chemicals have been reported to be associated with this source:

- Barium as high as 1140 mg/kg
- Cadmium as high as 6.4 mg/kg
- Lead as high as 86.2 mg/kg

The field investigation for this PA/SI of the Booker Landfill site is designed (1) to further examine the extent, concentration or types of wastes present on-site and to identify sources of hazardous substances, and (2) to evaluate whether hazardous substances may be migrating from the site such that potential receptors are affected.

2.5 POTENTIAL MIGRATION AND EXPOSURE PATHWAYS

The migration of and exposure to any hazardous substances at the site may occur through the groundwater, surface water, soil exposure, or air pathways. Available information about each pathway, the suspected likelihood of a release, and the potential for exposure are summarized in the following subsections. The pathway information presented is preliminary and will be further assessed during the PA/SI.

2.5.1 Groundwater Pathway

Regionally, 35 percent of potable groundwater in Harris County is pumped from the Chicot and Evangeline aquifers. The Chicot Formation overlies the Evangeline Formation and the aquifers may be interconnected. The Chicot aquifer is the shallower of the two units; the top of the Chicot aquifer is approximately 175 feet bgs in the site area. The Chicot aquifer extends to approximately 400 feet bgs. The Evangeline aquifer underlies the Chicot aquifer, extend to approximately 1,000 feet bgs. The Chicot-Evangeline aquifer system is overlain by the Beaumont Formation. The Beaumont Formation is a Pleistocene-aged clayey soil formation known for its shrink-swell properties and is

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considered a confining layer. The Chicot-Evangeline aquifer system is not in communication with shallow groundwater-bearing zones that overlie the Beaumont Formation.

Based on STATR-2's experience, the depth to the shallowest groundwater-bearing zone in this area of Houston is approximately 15-30 feet below ground surface (bgs). However, the depth groundwater used as a drinking water supply in this geologic area is believed to be approximately 300 feet bgs based on reported local well depths. Releases to the shallow groundwater-bearing zone may have occurred on-site because the areas containing the wastes at the landfill do not have engineered liners. However, significant release to deeper groundwater used for drinking water is not suspected.

No public water wells are located within 4 miles of the Booker Landfill site. The surrounding residential areas are all reported to be served by the City of Houston municipal water system. Based on review of information available from the Texas Water Development Board (TWDB) groundwater and water well database, approximately 4 water wells have been identified within 1 mile of the Booker Landfill site. None of these wells are domestic drinking water wells. No water wells are known to exist on-site.

2.5.2 Surface Water Pathway

No surface water bodies are located in the immediate vicinity of the site. Any discharges from the sources at the site most likely would flow overland towards the north and Tidwell Road and into the city stormwater system. At the south boundary of the property drainage occurs into the ditch just north of the residential properties off West Donovan Street and flows down either Phillips Road or Bersey Lane and into the city stormwater system off West Donovan Street. The flow eventually enters into Whiteoak Bayou.

2.5.3 Soil Exposure Pathway

Affected soil potentially may be present in areas where landfilled municipal waste was disposed on-site. No residences are located on-site, and no permanent, full-time personnel are present on-site. Possible receptors include residences that abut the site and trespassers may be exposed to potentially

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affected soil since the site is unfenced. Population data will be obtained during the PA/SI.

2.5.4 Air Pathway

At this time, a significant release to air is not suspected to occur at the Booker Landfill site due to the site containing municipal wastes and there being a lack of significant odors during the site reconnaissance. Potential targets of any releases to the air include area residences. Nearby population data will be obtained during the PA/SI.

3. SAMPLING APPROACH AND PROCEDURES

This PA/SI is being performed to evaluate the possibility that there are hazardous substances present in the potential source areas and exposure pathways at or near the Booker Landfill site. The primary chemicals of concern at the site are believed to be Target Analyte List (TAL) metals, and possibly VOCs, SVOCs and TPH. It is currently unknown if there are any other hazardous substances present. The field investigation activities that will be conducted to assess the site are presented in this section.

3.1 DATA QUALITY OBJECTIVES

The objectives of the sampling activities described in this QASP are to characterize potential chemicals of concern in the source area and migration pathways associated with the site. Based on discussions with the EPA Site Assessment Manager (SAM), the following data quality objective (DQO) has been established for this project:

1. Assess the concentrations of VOCs, SVOCs, TAL metals, cyanide, PCBs, and pesticides in surface soils. The areas that will be sampled include the landfill, the ditch south of the site and some residential yards adjacent to the site.

Additional sampling may be performed upon request by the EPA SAM. The data quality objective is described in more detail in Appendix B.

3.2 MOBILIZATION

The START-2 field team will mobilize the required equipment and personnel to the site as scheduled with the EPA SAM and TCEQ. The field team will perform safety planning, community relations assistance, command post establishment, and review work activities as part of the mobilization effort before sampling activities are initiated.

3.2.1 Health and Safety Plan Implementation

The field activities will be conducted in accordance with the site-specific Health and Safety Plan

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(HASP). A designated Site Health and Safety Coordinator (SHSC) will be responsible for implementation of the HASP during the field activities. START-2 personnel will conduct work according to the requirements of the HASP. In accordance with the START-2 general health and safety operating procedures, the field team will drive the route to the hospital specified in the HASP prior to initiating intrusive work.

3.2.2 Community Relations

It is anticipated that TCEQ and/or EPA representatives will be present during sampling activities and the START-2 sampling team will defer community relations management to them. The START-2 FTL will defer conversations with the public to an EPA Region 6 representative or the TCEQ community relations liaison. If neither EPA nor TCEQ personnel are present, the START-2 FTL, under the guidance of the START-2 Deputy Program Manager, will manage community relations as directed by EPA Region 6 personnel. The START-2 FTL and/or Deputy Program Manager will report any significant discussions with the public to the EPA SAM as soon as possible.

At this time, a signed site access agreement for the Booker Landfill Property has not been obtained because ownership contacts have been difficult to establish. START-2 and EPA will continue to pursue site access agreement. TCEQ is also participating in the investigation of the Booker Landfill Site, and it is the understanding of START-2 that, if signed site access is not obtained, START-2 will access the site under the authority of the TCEQ when TCEQ representatives are on-site. START-2 will not enter any site without a signed site access agreement or without the presence of TCEQ representatives unless so directed by EPA. Access agreements will be obtained while in the field from the residential properties. These access agreements have not yet been obtained, but will be attached as Appendix A as they are received.

3.2.3 Field Activities Review Meeting

The START-2 FTL will conduct a meeting with the entire field team to familiarize them with the scope of work, discuss the planned field activities, and review the project HASP and other relevant START-2 operating procedures before initiating work. The roles and responsibilities of the field team members will be assigned by the FTL during this meeting.

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3.2.4 Command Post and Zone Establishment

The field team will establish a command post at the site upon arrival. Support zones, a contamination reduction zone, and an exclusion zone for the work will be established according to the HASP. The safety requirements for working in each area of the site will be reviewed before the initiation of intrusive activities.

3.2.5 Sample Location Reconnaissance

On 2 October 2003, START-2 personnel completed an initial reconnaissance of the site to determine possible sample locations. Based on this reconnaissance and consultation with the EPA SAM, START-2 has identified potential sample locations for the characterization of the source area and surface soil pathway. The field team will review selected sample locations upon arrival at the site to confirm their accessibility for sampling. Final sample locations will be determined in the field.

Deviations from sample locations or number of samples may be required due to new observations made prior to sampling, to information obtained in the field that warrants an altered or additional sampling point, to difficulty in sample collection, or to limited access. Any necessary and significant deviations from the sample locations identified in the work plan will be reported to the START-2 Deputy Program Manager before sampling begins. The EPA SAM will be notified, and concurrence will be obtained for significant deviations from the planned sampling points or number of samples proposed.

3.3 SAMPLING AND ANALYSIS APPROACH

START-2 anticipates performing sampling of the surface soil pathway to obtain the data needed to meet the objectives of this investigation. The groundwater, surface water and air pathways will not be sampled by START-2 at this time. The nature and extent of START-2 sampling locations will be determined with the EPA SAM prior to sampling. Sampling will be performed in general accordance with applicable SOPs (Appendix C). Additional sampling may be performed upon request by the EPA SAM. A summary of the sampling to be performed and the rationale for sampling at each location is provided in Table 3-1. The planned sample locations are shown in

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Figure 3-1.

3.3.1 Source Characterization Sampling

START-2 will collect discrete samples to potential source soil exposed at the ground surface at the Booker Landfill Site. START-2 will collect four soil source characterization samples one field duplicate, as follows:

- One source characterization soil sample will be collected from the northeast corner of the former landfill site.
- One source characterization soil sample will be collected from southeast corner of the former landfill site.
- One source characterization soil sample will be collected from the northwest corner of the former landfill site.
- One source characterization soil sample will be collected from the southwest corner of the former landfill site.
- One field duplicate soil sample will be collected in conjunction with one of the samples described above. The sample location of the field duplicate will be determined in the field.

Proposed source characterization soil sample locations are illustrated on Figure 3-1; the exact locations of these samples will be determined in the field. Source characterization soil samples will be targeted to areas believed most likely to contain hazardous substances based on visual assessment of soil conditions, runoff patterns, etc. Source characterization soil samples will be collected at a depth interval from 0 to 6 inches bgs, if appropriate. Source characterization soil samples will be submitted to the laboratory for the analyses listed in Table 3-1. A Global Positioning System (GPS) receiver will be used in the field to record the exact location of each sample collected. Deviations from the proposed sampling locations, depicted in Figure 3-1, are not anticipated, but may occur because of field observations or access difficulties. Any significant deviations from the proposed sampling plan will be discussed with the EPA SAM.

Source characterization soil samples will be delivered to the participating laboratory for Target

Compound List (TCL) VOCs, TCL SVOCs, TCL pesticides, PCBs, cyanide, and TAL metals analyses. The EPA Contract Laboratory Program (CLP) will be utilized unless otherwise directed by the EPA SAM. The analyses for the source characterization samples are listed on Table 3-1. Laboratory methods and sampling requirements are summarized in Table 3-2.

3.3.2 Background Soil Sampling

START-2 will collect three background soil samples. The background samples will be collected in undisturbed, visually clear areas of right-of-ways or at nearby properties where access can be obtained. The drainage ditch to the east of the site may be one location to collect these samples. The samples will be collected at a depth of 0 to 6 inches using hand augers and disposable plastic scoops. The background sample locations are not shown on Figure 3-1 as they will be determined in the field.

3.3.3 Surface Soil Sampling

START-2 will collect a total of 12 surface soil samples from the W. Donovan properties and the ditch between the site and West Donovan Street properties. The samples will be collected approximately at the locations shown on Figure 3-1 from a depth of 0 to 6 inches below grade. The samples will be collected as discrete samples and will not be composited. The samples will be collected with dedicated plastic scoops, placed into pre-cleaned containers, and then double bagged for shipping. The samples for all analyses except VOCs should be homogenized prior to placement in the sample jar. Samples for VOC analyses should not be homogenized and will be collected using the Encore® sampling technique. The planned sample locations are shown on Figure 3-1 but final locations will depend on the ability to get property access. The sampling rationale is described in Table 3-1. Laboratory methods and sampling requirements are summarized in Table 3-2.

When samples are collected to assess the presence of soil contamination and the potential soil exposure threat associated with a residence or work place, the field team will attempt to collect the soil samples from locations that meet the following criteria:

- Sample locations should be at properties for which sampling permission has been granted by the landowner.
- Sample locations should be within 200 ft of the residence or work place on the property.
- Sample locations should be placed in areas where the presence of contamination is suspected to be most likely (based on topography, etc.) within the limits of the above criteria.
- Sample locations should be in areas where sampling can be performed without damaging features such as gardens, driveways, or obvious heavy-traffic areas.

Soil generated by the sampling process that is not retained as a sample will be replaced in the boring from which it came in order to fill the holes created. If necessary, potting soil will be added at the surface to completely fill the holes, and the sod will be replaced. START-2 does not expect to generate soil that will require off-site disposal.

3.4 INVESTIGATION-DERIVED WASTES (IDW)

It is anticipated that investigation-derived wastes (IDWs) such as personal protective equipment (PPE) and disposable sampling equipment will be generated during the project. After sampling, surface soil sample cuttings will be returned to the hole from which they were generated. START-2 does not anticipate generating any equipment decontamination rinsate water, as disposable sampling equipment will be used. Disposable sampling equipment and used PPE will be containerized using garbage can liners and disposed off-site. It is anticipated that minimal amounts of IDW will be generated. If decontamination fluids are generated, they will be stored on-site in a marked, 55-gallon drum, and disposed after the sampling results are received.

3.5 QUALITY ASSURANCE SAMPLES

As part of the sampling activities described above, START-2 will collect QA/QC samples. The data obtained from duplicate samples will be used to assist in the quality assurance of the sampling and laboratory analytical procedures, allowing an evaluation of the reproducibility of the results. Duplicates will be collected at locations selected by the START-2 FTL. Efforts will be made to collect duplicate samples in locations where the presence of hazardous substances is most suspected. The samples will be analyzed for the same parameters as the parent samples. Duplicate samples will be collected as follows:

- One blind field duplicate soil sample will be collected for every 20 soil samples. The duplicates will be collected at a locations selected by the START-2 FTL. The data obtained from this sample will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of the reproducibility of the results. Efforts will be made to collect the duplicate sample in a location where there the presence of hazardous substances is most suspected. The samples will be analyzed for the same parameters as the other soil samples.
- Extra sample volume will be collected for laboratory matrix spike (MS) and matrix spike duplicate (MSD) analyses. The extra volume will consist of triple the sample volume for organics, and double the sample volume for inorganics, at a rate of 1 extra volume per 20 samples of a given matrix unless otherwise directed by EPA Houston laboratory personnel.
- Temperature blanks will be placed in each sampling cooler. Temperature blanks will be prepared by pouring deionized water into a 40 mL glass VOA vial or will be provided by the designated laboratory.
- One rinsate blank will be collected. The rinsate blank will be collected by pour deionized water over a decontaminated sampling device and collecting that rinsate water in sample containers. The rinsate blank will be analyzed for the full suite of TCL organic and TAL inorganic parameters.

3.6 SAMPLE MANAGEMENT

3.6.1 Sample Identification

Each sample will be appropriately documented and identified using the appropriate Contract Laboratory Program (CLP) Forms II Lite labels, tags, and forms. Surface soil samples will receive a sample number beginning with BLSS-xx, where 'xx' represents the discrete sequential sample station number. Sample numbers will be appended with a suffix in the following manner: 'A' represents a normal field sample, 'B' represents a duplicate field sample, 'C' represents a trip blank, and 'D' represents a Field Blank. An example of a normal soil sample collected from the first station is: BLSS-01-A.

3.6.2 Sample Preservation, Containers, and Hold Times

Once collected, the samples will be stored in coolers and maintained on ice at approximately 4°C while at the site and until they are submitted to the laboratory for analysis. The samples will be sent to the participating laboratory via Federal Express each day during sampling activities. Table 3-2 lists the typical required containers, maximum holding times, and preservation methods for planned sample analyses. Samples that have been analyzed will be disposed of by the designated laboratory in accordance with the laboratory SOPs.

3.6.3 Sample Handling Procedures

Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objectives. The volume of the sample must be sufficient to perform the analysis requested. Samples will be stored in the proper containers and preserved in a manner appropriate for the analysis to be performed.

Clean decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area. Samples will be collected with new, pre-cleaned, disposable sampling equipment. Samples collected for laboratory analysis will be placed directly into pre-cleaned, unused glass or plastic containers. Sampling personnel will change gloves between each sample collection/handling.

Samples will be assembled and catalogued prior to shipping (SOPs 1101.01 and 1102.01) to the designated laboratory.

3.7 DECONTAMINATION

It is anticipated that only disposable sampling equipment (soil samplers) will be used during the Booker Landfill site PA/SI sampling event. In the event that nondisposable sampling equipment is used, sampling equipment will be thoroughly decontaminated before initial use, between uses, and at the end of the field investigation. Equipment decontamination will be completed in the following manner:

- The equipment will be washed in a potable water and detergent (e.g., Liquinox) solution.
- The equipment will be rinsed with deionized or distilled water.
- The equipment will be allowed to air dry.
- Clean equipment will be wrapped or otherwise contained to keep it clean for reuse.

Decontamination, if necessary, will be conducted using 5-gallon buckets, 55-gallon drums, and a temporary decontamination area constructed in an area identified prior to the beginning of field activities. The fluids and excess soil/sediment generated from equipment decontamination will be placed in a drum and staged on-site. The drum will be labeled with the name of the site, the contents, sampling location, and date. The analytical data from collected samples will be reviewed after completion of the field activities and disposal options will be evaluated accordingly.

TABLE 3-1
Sampling Rationale Summary

Sample Station Number	Sample Type	Analysis	Rationale for Sample Collection
BLSS-01-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize Potential Source Area.
BLSS-02-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize Potential Source Area.
BLSS-03-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize Potential Source Area.
BLSS-04-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize Potential Source Area.
BLS-0X-B	Surface Soil Duplicate	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Discrete Soil QC sample, Location to be Determined in the Field
BLSS-05-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Background Soil Sample
BLSS-06-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Background Soil Sample
BLSS-07-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Background Soil Sample
BLSS-08-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize southern site ditch
BLSS-09-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize southern site ditch
BLSS-10-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize southern site ditch
BLSS-11-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize southern site ditch
BLSS-12-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize southern site ditch
BLSS-13-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize W. Donovan Properties
BLSS-14-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize W. Donovan Properties
BLSS-15-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize W. Donovan Properties
BLSS-16-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize W. Donovan Properties

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TABLE 3-1 (CONTINUED)
Sampling Rationale Summary

Sample Station Number	Sample Type	Analysis	Rationale for Sample Collection
BLSS-17-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize W. Donovan Properties
BLSS-18-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize W. Donovan Properties
BLSS-19-A	Surface Soil	VOCs, SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Characterize W. Donovan Properties

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TABLE 3-2
Sampling and Analysis Requirements

SOLID MATRIX				
Analysis	Method No.	Bottles Required	Preservation Required	Holding Time
TCL VOCs	EPA Method SW8260B	Encore [®] Samplers	Ice to 4°C	48 hours until extraction
TCL SVOCs	EPA Method SW8270C	8 oz. Glass Jars	Ice to 4°C	14 days until extraction and 40 days after extraction
TCL Pesticides and PCBs	EPA Method SW8081A- (PEST), Method SWA8082- (PCBs)	8 oz. Glass Jars	Ice to 4°C	14 days until extraction and 40 days after extraction
TAL Metals	EPA Method SW6010B- (metals), SW9010B- (cyanide)	8 oz. Glass Jars	Ice to 4°C	180 days

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4. QUALITY ASSURANCE

Quality assurance will be conducted in accordance with the WESTON Programmatic Quality Assurance Project Plan (QAPP), dated May 2003. The START-2 FTL will be responsible for QA/QC field investigation activities. The designated laboratory utilized during the investigation will be responsible for QA/QC related to analytical work. START-2 will collect samples for blind analyses and inter sample comparisons to verify that laboratory QA/QC is consistent with the required standards as discussed in the QAPP.

4.1 SAMPLE CUSTODY PROCEDURES

Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, samples will be maintained under the chain-of-custody procedures. If the sample collected is to be split (laboratory QA/QC), the sample will be allocated into similar sample containers. Sample labels completed with the same information as that on the original sample container will be attached to each of the split samples. Personnel required to package and ship coolers containing potentially hazardous material will be trained accordingly.

The chain-of-custody (COC) procedures are documented in SOP 1101.01 (Appendix C) and will be made available to all personnel involved with the sampling. A typical chain-of-custody record included in SOP 1101.01 will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples. START-2 personnel will complete a COC form for all samples sent to a START-2 designated off-site laboratory.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- Samples will be accompanied by the chain-of-custody record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory.
- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to it to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.
- If sent by common carrier, a bill of lading or air bill will be used. Bill of lading and air bill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

SOPs 1101.01 and 1102.01 describe these procedures in more detail (Appendix C).

4.2 PROJECT DOCUMENTATION

4.2.1 Field Documentation

Field documentation will be completed legibly and in black ink. Any corrections or revisions will be made by lining through the original entry, initialing, and dating the change. The following field documentation will be maintained.

4.2.2 Field Logbook (SOP 1501.01)

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number.

- Names of personnel on-site.
- Dates and times of all entries.
- Description of all site activities, including site entry and exit times.
- Noteworthy events and discussions.
- Weather conditions.
- Site observations.
- Identification and description of samples and locations.
- Dates and times of sample collections and chain-of-custody information.
- Records of photographs.
- Site sketches.

4.2.3 Sample Labels

Sample labels will be securely affixed to the sample container. They will clearly identify the particular sample and include the following information:

- Site name and project number.
- Date and time the sample was collected.
- Sample preservation method.
- Analysis requested.
- Sampling location.

4.2.4 Chain-of-Custody Record (SOP 1101.01)

A Chain-of-Custody will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it. The Chain-of-Custody is discussed in Subsection 4.1 Sample Custody Procedures.

4.2.5 Custody Seal

Custody Seals demonstrate that a sample container has not been opened or tampered with. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

4.2.6 Photo Documentation

START-2 will take photographs to document site conditions and activities as site work progresses. Initial conditions will be documented by photographing features that define the site-related contamination or special working conditions. Representative photographs should be taken of each type of site activity. The photographs should show typical operations and operating conditions as well as special situations and conditions that may arise during site activities. Site final conditions will be documented as a record of how the site appeared at completion of the work. Photographs will be taken with either a film camera or digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject will be depicted on a site sketch. SOPs 1502.01 and 1502.02 discuss photo documentation in more detail (Appendix C).